

WE CLAIM:

1. A structure comprising a shaped and layered construction, the structure comprising:

(a) an acrylic polymer layer having a thickness up to about 2.5 mm;

(b) a thermoplastic layer having a thickness of about 0.5 mm to about 15 mm;
and

(c) a third layer comprising a fiber reinforced composite.

2. A structure according to claim 1 wherein the acrylic polymer layer is an exposed exterior layer of the construction.

3. A structure according to claim 2 wherein the acrylic layer is adjacent the thermoplastic layer.

4. A structure according to claim 2 wherein the third layer is adjacent to the thermoplastic layer.

5. A structure according to claim 1 wherein the acrylic polymer layer is an exposed decorative exterior layer of the construction.

6. A structure according to claim 1 wherein the acrylic polymer layer is about 0.4 mm to about 1 mm and the thermoplastic layer is about 1.5 mm to about 15 mm.

7. A structure according to claim 2 wherein the layer of acrylic polymer and the thermoplastic layer comprise a laminate.

8. A structure according to claim 1 wherein the thermoplastic layer is selected from the group consisting of ABS, ASA or ABS-acrylic alloy.

9. A structure according to claim 7 wherein the laminate is a thermoplastic sheet.

10. A structure according to claim 1 wherein the structure is in the shape of a bathroom tub, tub surround or spa.
11. A structure according to claim 1 wherein the construction is a component of a motor vehicle.
12. A structure according to claim 11 wherein the construction is a component of a motor vehicle door, hood, trunk lid or tonneau.
13. A structure according to claim 1 wherein the construction is a component of a boat.
14. A structure according to claim 1 wherein the construction is a component of a recreation vehicle.
15. A structure according to claim 1 wherein the construction is a component of a recreational equipment.
16. A structure according to claim 15 wherein the construction is a component of a canoe, kayak, water slide, water skis, golf cart or playground equipment.
17. A structure according to claim 1 wherein the construction is a component of an aircraft or aerospace device.
18. A structure according to claim 1 further comprising rigid polyurethane foam reinforcement.
19. A construction according to claim 1 wherein the fiber reinforced composite comprises a cured thermoset resin reinforced composite.
20. A construction according to claim 19 wherein the thermoset resin comprises a cured unsaturated polyester resin.
21. A construction according to claim 19 wherein the composite is reinforced with glass fiber

22. A structure according to claim 18 further comprising a fiber reinforcement composite layer enclosing the rigid polyurethane foam reinforcement.

23. A structure according to claim 1 further comprising a structure including a substantially planar surface adjacent to one angle of about 85 to 105°.

24. A structure according to claim 23 further comprising a curved surface adjacent to the angle or to the planar surface.

25. A structure according to claim 1 further comprising an installation aperture.

26. A structure according to claim 1 further comprising an attachment flange.

27. A structure comprising a shaped and layered construction, the structure comprising:

(a) an acrylic polymer layer having a thickness up to about 2.5 mm;

(b) a thermoplastic layer having a thickness of about 0.5 to about 15 mm;

(c) a third layer comprising an acrylic polymer, ASA or ABS-acrylic alloy; and

(d) a fiber reinforcement composite layer contiguous with the third layer.

28. A structure according to claim 27 wherein the acrylic polymer layer is an exposed exterior layer of the construction.

29. A structure according to claim 28 wherein the acrylic layer is adjacent the thermoplastic layer.

30. A structure according to claim 28 wherein the third layer is adjacent to the thermoplastic layer.

31. A structure according to claim 27 wherein the acrylic polymer layer is a decorative exterior layer of the construction.

32. A structure according to claim 27 wherein the acrylic polymer layer is about 0.4 mm to about 1 mm and the thermoplastic layer is about 1.5 mm to about 15 mm.

33. A structure according to claim 28 wherein the layer of acrylic polymer and the layer of thermoplastic comprise a laminate.

34. A structure according to claim 27 wherein the thermoplastic layer is selected from the group consisting of ABS, ASA or ABS-acrylic alloy.

35. A structure according to claim 33 wherein the laminate is a thermoplastic sheet.

36. A structure according to claim 27 wherein the structure is in the shape of a bathroom tub, tub surround or spa.

37. A structure according to claim 27 wherein the construction is a component of a motor vehicle.

38. A structure according to claim 37 wherein the construction is a component of a motor vehicle hood, door, trunk lid or tonneau.

39. A structure according to claim 27 wherein the construction is a component of a boat.

40. A structure according to claim 27 wherein the construction is a component of a recreation vehicle.

41. A structure according to claim 27 further comprising rigid polyurethane foam reinforcement.

42. A construction according to claim 27 wherein the fiber reinforced composite comprises a cured thermoset resin reinforced composite.

43. A construction according to claim 42 wherein the thermoset resin comprises a cured unsaturated polyester resin.

44. A construction according to claim 42 wherein the composite is reinforced with glass fiber

45. A structure according to claim 27 further comprising a fiber reinforcement composite layer enclosing the rigid polyurethane foam reinforcement.

46. A structure according to claim 27 further comprising a structure including a substantially planar surface adjacent to one angle of about 85 to 105°.

47. A structure according to claim 46 further comprising a curved surface adjacent to the angle or to the planar surface.

48. A structure according to claim 27 further comprising an installation aperture.

49. A structure according to claim 27 further comprising an attachment flange.

50. A structure comprising a shaped and layered construction, the structure comprising:

(a) an acrylic polymer layer having a thickness up to about 2.5 mm;

(b) a thermoplastic ABS or ABS-acrylic alloy layer having a thickness of about 0.5 mm to about 15 mm;

(c) a third layer comprising an acrylic polymer, ASA or ABS-acrylic polymer alloy;

(d) a fourth layer comprising a fiber reinforcement composite contiguous with the third layer; and

(e) a structural polymer foam reinforcement.

51. A structure according to claim 50 wherein the acrylic polymer layer is an exposed exterior layer of the construction.

52. A structure according to claim 51 wherein the acrylic layer is adjacent the thermoplastic layer.

53. A structure according to claim 51 wherein the third layer is adjacent to the thermoplastic layer.

54. A structure according to claim 50 wherein the acrylic polymer layer is an exposed decorative exterior layer of the construction.

55. A structure according to claim 50 wherein the acrylic polymer layer is about 0.4 mm to about 1 mm and the thermoplastic layer is about 1.5 mm to about 15 mm.

56. A structure according to claim 51 wherein the layer of acrylic polymer and the layer of thermoplastic comprise a laminate.

57. A structure according to claim 50 wherein the thermoplastic layer is selected from the group consisting of ABS, ASA or ABS-acrylic alloy.

58. A structure according to claim 56 wherein the laminate is a thermoplastic sheet.

59. A structure according to claim 50 wherein the structure is in the shape of a bathroom tub, tub surround or spa.

60. A structure according to claim 50 wherein the construction is a component of a motor vehicle.

61. A structure according to claim 60 wherein the construction is a component of a motor vehicle door, hood, trunk lid or tonneau.

62. A structure according to claim 50 wherein the construction is a component of a boat.

63. A structure according to claim 50 wherein the construction is a component of a recreation vehicle.

64. A structure according to claim 50 further comprising rigid polyurethane foam reinforcement.

65. A construction according to claim 50 wherein the fiber reinforced composite comprises a cured thermoset resin reinforced composite.

66. A construction according to claim 65 wherein the thermoset resin comprises a cured unsaturated polyester resin.

67. A construction according to claim 65 wherein the composite is reinforced with glass fiber .

68. A structure according to claim 50 further comprising a fiber reinforcement composite layer enclosing the rigid polyurethane foam reinforcement.

69. A structure according to claim 50 further comprising a structure including a substantially planar surface adjacent to one angle of about 85 to 105°.

70. A structure according to claim 69 further comprising a curved surface adjacent to the angle or to planar surface.

71. A structure according to claim 50 further comprising an installation aperture.

72. A structure according to claim 50 further comprising an attachment flange.